

Amortization

Annual Payments to Amortize a Loan of \$1,000

Yrs	3%	4%	5%	6%	8%	10%	12%	14%
2	523	530	538	545	561	576	592	607
3	354	360	367	374	388	402	416	431
4	269	275	282	289	302	315	329	343
5	218	225	231	237	250	264	277	291
6	185	191	197	203	216	230	243	257
8	142	149	155	161	174	187	201	216
10	117	123	130	136	149	163	177	192
12	100	107	113	119	133	147	161	177
15	84	90	96	103	117	131	147	163
20	67	74	80	87	102	117	134	151
25	57	64	71	78	94	110	127	145
30	51	58	65	73	89	106	124	143

payments rounded to whole dollars

Monthly Payments to Amortize a Loan of \$1,000

Yrs	3%	4%	5%	6%	8%	10%	12%	14%
2	43	43	44	44	45	46	47	48
3	29	30	30	30	31	32	33	34
4	22	23	23	23	24	25	26	27
5	18	18	19	19	20	21	22	23
6	15	16	16	17	18	19	20	21
8	12	12	13	13	14	15	16	17
10	10	10	11	11	12	13	14	16
12	8	9	9	10	11	12	13	14
15	7	7	8	8	10	11	12	13
20	6	6	7	7	8	10	11	12
25	5	5	6	6	8	9	11	12
30	4	5	5	6	7	9	10	12

payments rounded to whole dollars

Amortization Formulas

Annual Payments

$$\$_{\text{annual}} = [i / (1 - [1 / (1 + i)^n])] \times A$$

Periodic Payments (use $p=12$ for monthly payments)

$$\$_{\text{periodic}} = [(i / p) / (1 - [1 / (1 + i/p)^{n \times p}])] \times A$$

$\$$ = periodic payment

A = amount financed i = interest rate (in decimals)

n = number of years p = number of payments per year

most spreadsheets use \wedge (uppercase 6) to raise to an exponent

Farm Machinery Management and Costs

Fuel cost per acre ($\$/A$) = hours/acre X gallons/hour X $\$/gallon$

Hours per acre (hr/A) = 8.25 ÷ (speed (mph) X implement width (ft) X fuel efficiency)

Acres per hour (A/hr) = (speed (mph) X implement width (ft) X fuel efficiency) ÷ 8.25

Speed (mph) = 225 ÷ (seconds to travel 330')

Fuel efficiency = time an implement is actually performing effective work ÷ time it is in the field (expressed as a decimal)

Fuel Efficiency (f.e.) for Types of Implements

Operation	Typical f.e.	Operating Speed
Tillage (disk, plow, cultivate)	.60	3 – 6 mph
Mowers, rakes, conditioners	.75	4 – 6 mph
Planters, drills	.70	3 – 6 mph
Harvest (combine, forage chop, bale)	.65	1½ - 4 mph
Sprayers	.60	3 – 6 mph

Fuel Consumption per Hour

Gas	.065 gal x maximum rated pto hp
Diesel	.048 gal x maximum rated pto hp
LP gas	.080 gal x maximum rated pto hp

Feet / second (ft/sec) =
mph X 22 ÷ 15

Fuel Consumption for Max Rated Drawbar Horsepower (db hp) gal/hr

Type	30 db hp	60 db hp	90 db hp	120 db hp	150 db hp
For tractors doing rated work					
Diesel	2.3 gph	4.6 gph	6.9 gph	9.2 gph	11.5 gph
Gasoline	3.2 gph	6.3 gph	-	-	-
LP gas	4.7 gph	9.2 gph	-	-	-
For tractors doing average work					
Diesel	1.5 gph	3.1 gph	4.8 gph	6.2 gph	7.5 gph
Gasoline	2.4 gph	4.7 gph	-	-	-
LP gas	3.5 gph	6.9 gph	-	-	-

Equivalent Travel Rates

Feet per Minute	Miles per Hour (mph)						
	1mph	1.5mph	2mph	3mph	4mph	5mph	6mph
	88'	123'	176'	264'	352'	440'	528'

Fixed (Ownership) and Variable (Operating) Costs for Farm Machinery

- **Fixed Costs** include depreciation, taxes, housing, interest and insurance. Use 16% of original purchase price as an estimate of annual fixed costs.
- **Variable Costs** include fuel and lubricants, maintenance and labor (operator) wage. Use consumption rates above to estimate fuel costs; lubricants typically cost about 15% of fuel cost. Maintenance costs are often estimated at about 5% per year of the initial purchase cost over the lifespan of the tractor. Wheel tractors have an expected mechanical life of about 12,000 hours.

Reduce Tractor Costs:

- Much of the work performed by a tractor is "light-load work". It is estimated that up to 20% of the tractor's annual fuel bill could be saved by shifting up and reducing engine speed when doing light work.

Tractor Safety: Tractors Are the #1 Cause of Farm Fatalities

- Make sure the gear shift is in neutral before cranking.
- Securely fasten seat belt, if the tractor has a ROPS.
- Do not permit riders.
- Avoid operating near ditches, embankments, holes.
- Stay off steep slopes; cross slowly, back up slope, drive forward downhill.
- Stop power take-off before dismounting; don't dismount when pto is in motion.
- Never refuel tractor while engine is running or extremely hot.
- Hitch only to the drawbar and hitch points recommended by manufacturer.
- When tractor is stopped, set brakes securely and use park lock.

